SIEMENS

MAMMOMAT *Novation*^{DR}

SP

Installation Protocol

with DROC

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Chapter	Page	Revision
All	All	01
All	All	02

Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

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Delivery, installation, cabling and start-up

Room preparation

- The following topics must be clarified with the project manager before the delivery date:
  - Building inspection by the service provider
  - Floor loading
  - Floor condition
  - Barriers, crane, tools.
- The project manager must be on site for information on arrival of the service provider.
- The orientation point is marked by the project manager.
- The current project plan is handed over to the service provider on site.
- Line voltage is available at the on-site system distributor.
- The system emergency off is installed by the customer.
- Cable ducts etc. must be installed.
- All room preparations by the customer are completed and the room is swept clean.
- Radiation protection partition is available.
- To be able to install the covers, the system must be started up partially. This requires a Siemens service engineer who connects and switches on the voltage to the MAMMOMAT *Novation*^{DR}.
- Seal the joints of the unit base with silicone.

NOTICE **All work must be performed in accordance with the supplied documents.**

Delivery

- A long elevating truck is required for transporting the unit carrier on the pallet.
- The system is brought into the room.
- Unpacking and bringing in all system components of the unit.
- Inspecting the components for damage.

Installation

- Taking along all required tools, measuring and installation aids according to the tool list.
- Positioning and aligning all system components according to the project plan or the statements of the PM.
- Installing accessories and options.
- Aligning, drilling and anchoring the unit base, if necessary, screw tight and tighten with the torque stated in the MAMMOMAT *Novation*^{DR} installation instructions.
- Remove all transport protection devices.

- All fastenings must be tightened with the torques stated in the installation instructions and secured where necessary with Locite 221.
- All values must be entered according to instructions in the corresponding certificates.
- Install the detector

System cabling

- Perform the cabling of the system components of the MAMMOMAT *Novation*^{DR}, options, control consoles and monitors corresponding to the installation instructions.
- Connect foot switches.

Start up

- Power up the system and the Acquisition Workstation.
- Perform X-ray tube, collimator, dose settings, OPDOSE and OPCOMP checks.
- Check the image quality and perform the appropriate Quality Control tests.
- Connect the system to the LAN.
- Configure the system in regards to DICOM services.

Other work

- Close all cable ducts.
- Install all covers and clean them if necessary.
- Clearing and cleaning the installation room (swept clean).
- Unpack accessories, if the premises allow this.
- Return all installation racks and packaging materials.
- Damage caused to the building by the work must be reported to the project manager/ person responsible for the project.
- The SP Q "**Quality Certificate"** has to be filled out and signed. The form can be found in chapter 9 "**Certificates**" of the technical documentation binder (Appendix of 66 46 900 QZE 01S 00). It has to be sent to the address stated on the certificate, only if installation or start-up problems occurred. Place a copy of the SP Q Quality Certificate in the technical documentation binder.
- A copy of the Installation Protocol remains with the system in chapter 3 "**Assembly/ Installation**" of the technical documentation binder.
- Creating a digital installation report that includes the following points:
  - Difficulties experienced when bringing the system into the room
  - Product errors
  - Potential for improvement
  - Other occurrences

Pictures are enclosed for better understanding.

Site data

SAP No.: _____ System Ser. No.: _____

Customer: _____

Country/city: _____

Installation team: _____

Project manager: _____

Installation start: _____ Installation end _____

Auxiliary Materials used

Item	Model	Calibration date	Serial number
Oscilloscope >50MHz with memory			
Digital multimeter including an mAs meter			
Power line impedance meter			
Power ground-wire tester			
Luminance meter (for monitor calibration)			
Luminance meter (measures the light intensity from the X-ray field)			
Dose meter			
Ion chamber			
Densitometer			
A non-invasive digital kV meter			

Tab. 1 Auxiliary materials

Installation and start-up steps performed

	Work performed	
	yes	no
The system was installed according to the supplied documents.	❑	❑
Delivery of the system:		
All components were delivered.	❑	❑
The system delivery is complete, according to dispatch note.	❑	❑
All parts are undamaged.	❑	❑
The system emergency off is installed by the customer.	❑	❑

	Work performed	
	yes	no
Installation:		
The stand is anchored to the floor.	❑	❑
The radiation shield is anchored to the floor.	❑	❑
The MAMMOMAT *Novation*^{DR} was installed completely	❑	❑
Missing parts are noted in the installation protocol.	❑	❑
The project plan was available.	❑	❑
The radiation shield and AWS are installed according to project plan	❑	❑
All covers are mounted.	❑	❑
The temperature logger was sent to DirectRay Coorperation (DRC)	❑	❑
Cabling:		
System cables are run and connected according to the documents.	❑	❑
All options are positioned and cabled	❑	❑
Enough cable ducts were available and with a sufficient length	❑	❑

	Work performed	
	yes	no
Start up:		
Check power supply voltages	❑	❑
Mechanical checks performed	❑	❑
X-ray tube checks performed	❑	❑
Collimator checks performed	❑	❑
Dose settings checked	❑	❑
Acquisition workstation configurations performed	❑	❑
Configured DICOM services	❑	❑
Image quality tests performed	❑	❑
Acceptance tests performed	❑	❑
Ground wire tested	❑	❑
Line resistance tested	❑	❑
Backup for acquisition workstation and MAMMOMAT created	❑	❑
SP Q "Quality Certificate" filled out and sent, when problems occurred with either the installation or start-up.	❑	❑

Installation / start-up settings

Tube high voltage, current and mAs values

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Tube high voltage, current and mAs values" on Page 9 - 1.

kV mAs Anode/ filter	Measured values	Result kV must be ±5% mAs must be ±10%
○ **30 kV** **20 mAs** **Mo/Mo**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ **30 kV** **20 mAs** **W/Rh**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ **35 kV** **100 mAs** **Mo/Mo**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ **35 kV** **100 mAs** **W/Rh**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ **25 kV** **100 mAs,** **Mo/Mo**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ **25 kV** **100 mAs** **W/Rh**	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs

Tab. 2 Tube high voltage, current and mAs values

kV mAs Anode/ filter	Measured values	Result kV must be ±5% mAs must be ±10%
● 30 kV 10 mAs Mo/Mo	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
● 30 kV 10 mAs W/Rh	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs
○ 25 kV - Mo/Mo	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs Display _____ mAs
○ 25 kV - W/Rh	_____V x 5 kV = _____V x (_____s + _____s + _____s) x 40 mA =	_____ kV _____ mAs Display _____ mAs

Tab. 2 Tube high voltage, current and mAs values

Collimator beam calibration

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Collimator beam calibration" on Page 10 - 3.

Focus and anode	XL	XR	YC	YS
Small focus molly				
Large focus molly				
Small focus tungsten				
Large focus tungsten				

Tab. 3 Collimator beam calibration

Collimator field light calibration

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Collimator field light calibration" on Page 10 - 5.

Item	XL	XR	YC	YS
Light field				

Tab. 4 Collimator field light calibration

AEC dose settings

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Checking the AEC dose settings" on Page 11 - 3.

AEC	kV	Anode / filter	Dose value	Pixel value
H	**28 kV**	**Mo/Mo**		
D				
H		**Mo/Rh**	**-**	
D			**-**	
H		**W/Rh**	**-**	
D			**-**	

Tab. 5 AEC dose settings

OPDOSE settings

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Checking OPDOSE" on Page 12 - 1.

Program button	Thickness	kV	Anode/filter combination	AEC
1				
2				
3				
4				

Tab. 6 OPDOSE Settings

Checking grid lines

Results from the **Installation Instructions** (SPB7-250.812.01...) chapter "Checking Grid Lines" on Page 13 - 1.

Exposure	Exp mode	mAs	PMMA / mm	Tube angle	Visible grid lines (yes/no)	X	Y	Mean pixel value difference [%]
1	mAs	32	30	0^o				
2	mAs	56	40	0^o				
3	mAs	200	60	0^o				
4	AEC "H"	-	40	0^o				
5	AEC "H"	-	40	$+ 60^o$				
6	AEC "H"	-	40	$- 60^o$				

Tab. 7 Measuring Grid Lines

Activity report

Day	Start	End	E	M	V	R	KA	Work performed	Employees/ number
Total (Mh)									

Explanation of the activity report

Day / Start / End	Date / start of work / end of work (time)
E	Bringing in the entire system in hours per/day
M	Installation of the entire system in hours per/day
V	Cabling of the system in hours per/day
R	Travelling time in hours per/day
KA	No order-related working time in hours per/day
Work performed	Work performed
Employees/number	Number of employees who were employed in the period
Total (Mh)	Man hours, number of accumulated hours multiplied by number of employees

General remarks

_____

_____

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_____

_____

_____

_____

_____

A copy of this remains at the system and is filed in the Assembly/Installation folder.

Place, date	Installation team employee	Siemens project manager/ person responsible for the project
	Name in block letters	Name in block letters

Changes to previous version 3 - 1

Chapter	Page	Change
2	1	Added the auxiliary material table.
2	5	Modified the measured values colum, so that 3 values can be added.
2	8	Modified the OPDOSE settings table.

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